Iranian Moves Offer Opportunity to Improve JCPOA

Olli Heinonen

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Introduction

Congress extended the Iran Sanctions Act earlier this month, prompting Iranian President Hassan Rouhani to order retaliatory steps. Tehran protested to the EU, claiming the extension is a violation of last summer’s nuclear deal – the Joint Comprehensive Plan of Action, or JCPOA – and requesting a meeting of the joint committee established to settle disputes over the deal’s implementation. Based on Rouhani’s same directive, Iran has also ordered its scientists to develop a plan to design and manufacture a nuclear-propulsion system and fuel for marine transportation.

Initiating plans to build nuclear-powered vessels would not itself be a violation of the nuclear deal, but Tehran’s steps do undermine the agreement’s spirit, as they would require uranium enrichment beyond the limits allowed by the deal. The United States and its partners in negotiating the deal should respond by initiating a process to address the flaws in the JCPOA that Iran can exploit.

Will Iran’s Plan Violate the JCPOA?

Among other restrictions on Iran’s nuclear program, the JCPOA places several limitations on Iran’s production of enriched uranium and use of nuclear power and research reactors. Over the next fifteen years, the deal prevents Tehran from enriching uranium above 3.67 percent, and requires it to rely only on light-water nuclear power and

3. “Zarif calls on Joint JCPOA Commission to convene to address US breach of Iran deal,” Islamic Republic News Agency (Iran), December 17, 2016. (http://217.25.54.55/en/News/82349959/)

Dr. Olli Heinonen is a senior advisor on science and nonproliferation at the Foundation for Defense of Democracies. He is the former deputy director general of the International Atomic Energy Agency (IAEA) and head of its Department of Safeguards.
research reactors for development, testing, and supplying electricity and desalination. Because marine reactors produce electricity to propel ships, Iran is arguing that any work on nuclear propulsion will be in compliance with the deal. The State Department has taken a cautious approach, noting that Iran’s plans remain unclear and that a marine nuclear propulsion program is a “massive undertaking for any nation” that would likely take decades to realize.

Recent comments by the head of Iran’s Atomic Energy Organization, however, raise concerns that the Islamic Republic will violate the JCPOA. He acknowledged during a recent joint press conference with the IAEA’s director general that currently, fuel used in all naval propulsion systems is enriched to between five and 90 percent, depending on the type of fuel, the goal of its use, and the needed refueling period. Even enrichment to five percent, however, would exceed the uranium enrichment caps set by the JCPOA.

**Global Use of Nuclear Propulsion Systems**

Since the 1940s, about 500 vessels with nuclear propulsion have been built globally. Most are nuclear-powered submarines that belong to nuclear-weapons states. The majority of nuclear-powered vessels are military ships, such as aircraft carriers, and only a few countries have constructed merchant vessels with nuclear reactors. Most of the civilian nuclear vessels are in Russia, which uses nuclear-powered icebreakers in the Arctic regions.

Currently, Brazil and Argentina are the only non-nuclear-weapons states with plans to build nuclear-powered submarines. Canada had plans in the 1980s to acquire such vessels to guard its vast Arctic waterways, but gave them up – largely because of their excessive costs.

Traditionally, naval reactors use highly enriched uranium as fuel in order to reduce reactor size. For example, American submarines use highly enriched uranium fuel of up to 97 percent, and fuel for Russian icebreakers is enriched up to 75 percent.

There have been some exceptions. France has used low-enriched uranium fuel (enriched to about 7.5 percent) for its submarines. Brazil’s planned nuclear submarine is also expected to use low-enriched uranium fuel. Previously, merchant ships such as the *USS Savannah*, *Otto Hahn* (Germany), and *Mutsu* (Japan) used low-enriched uranium fuel, but they have all been retired.

**Safeguards Implications**

This is not the first time Iran has announced its intentions to develop nuclear-powered ships. In 2012, *Fars News* reported that Rear Admiral Abbas Zamini was considering developing nuclear propulsion for submarines. The

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same year, the Iranian Parliament Committee on Industries and Mines approved a bill to power ships carrying energy supplies with nuclear fuel.\(^\text{11}\)

In 2012, Fereydoun Abbasi Davani, then head of Iran’s Atomic Energy Organization, also said that Iran was able to design nuclear reactors needed to power ships and submarines equipped with nuclear propulsion systems.\(^\text{12}\) In a 2012 interview, Zamini said the Iranian Navy was “in the early stages of the project to build nuclear submarines.”\(^\text{13}\)

Nuclear reactors for submarines are very different from those for surface ships, but Iran’s initial discussions in 2012 called for the design and construction of both. Assuming Iran uses the same plans now, and taking the Canadian and Brazilian experiences as models, such projects would likely cost billions of dollars and require enrichment beyond the permitted JCPOA levels.

If such design work had commenced in 2012 and continued since then, it would have significant safeguards implications. Even if the work did not yet include nuclear material, the activities should have been included under Iran’s Additional Protocol declaration submitted to the IAEA in July 2015.\(^\text{14}\) According to the Additional Protocol’s provisions, Iran is obliged to provide a general description of the location of research related to the nuclear fuel cycle, and of development activities not involving nuclear material. In other words, the declaration must include all activities related to any process or system development for the conversion of nuclear material, enrichment of nuclear material, nuclear fuel fabrication, reactors, and critical facilities – including those that would relate to research and development of nuclear propulsion systems.

However, IAEA reports since January 2016 – when the JCPOA was implemented – do not provide any details on Iran’s Additional Protocol declarations and whether the IAEA has sought clarification of the statements made by Iranian officials in 2012.

**Safeguarding Nuclear Submarine Fuel**

The IAEA monitors nuclear-powered ships and their fuel under basic safeguards of the Comprehensive Safeguards Agreement, but the issue is complicated by the fact that under Article 14, non-nuclear-weapon states are allowed to remove nuclear material intended for non-proscribed military use, such as fuel for nuclear submarines, from IAEA safeguards under arrangements with the Agency.

While any Iranian uranium conversion and enrichment and the manufacture of submarine fuel will be fully under IAEA safeguards, the Agency has not experienced a case in which a non-nuclear-weapon state has actually used nuclear fuel in a submarine. For example, while Brazil’s manufacture of submarine fuel is under safeguards, the country has yet to build a nuclear submarine, and has not yet been required to reach an agreement with the IAEA allowing for significant quantities of enriched uranium to be stockpiled without continuous IAEA monitoring.


\(^{13}\) “‘Iran has expertise to produce nuclear reactors to power ships, subs,’” *Mehr News Agency* (Iran, July 22, 2012. ([http://en.mehrnews.com/news/51991/Iran-has-expertise-to-produce-nuclear-reactors-to-power-ships](http://en.mehrnews.com/news/51991/Iran-has-expertise-to-produce-nuclear-reactors-to-power-ships))

The Brazilian case has, however, created a precedent such that the front end of Iran's submarine fuel cycle will be fully under IAEA safeguards. Iran will be able to negotiate what access the IAEA has to its strategic fuel reserve after the JCPOA enrichment limits sunset, even as other nuclear material facilities remain subject to the full provisions of the Comprehensive Safeguards Agreement.

**Recommendations**

Iran has now invoked the dispute settlement provisions of the JCPOA by claiming that the Iran Sanctions Act extension is a breach on Washington's part. In the future, Tehran could argue that due to that breach, it is relieved from its obligations and should be permitted, for example, to enrich and stockpile material above the caps set by the JCPOA or to halt the implementation of the Additional Protocol.

This situation is the first significant test of the JCPOA. The U.S. government should therefore use the opportunity not only to find a solution, but also to fix some of the JCPOA's previously identified weaknesses to ensure such situations do not reoccur.

Iran may be willing to negotiate modifications to the JCPOA or to clarify some points – albeit to its own benefit. The head of Iran's Atomic Energy Organization has criticized what he called “opaque points” in the deal that made it easy to be interpreted by the relevant parties in contradictory ways.¹⁵

Those negotiations will be difficult, but necessary. Among other issues, the U.S. should reiterate the IAEA's rights under the Comprehensive Safeguards Agreement and Additional Protocol to gain access to military institutes. Currently, as Iran is only provisionally implementing the Additional Protocol, the IAEAs access to its nuclear design and non-nuclear development activities depends on Tehran's willingness comply with JCPOA provisions.

The P5+1 signatories to the JCPOA should not accept Iranian plans that violate the spirit of the deal. Washington should negotiate an understanding with Iran and the other parties to the deal on the following points in order to strengthen the JCPOA and ensure Iran stays within its boundaries in letter and spirit:

- Iran should speedily ratify the Additional Protocol before the IAEA reaches any broader conclusion;
- The IAEA should seek clarifications of Iranian officials' statements in 2012 over developing nuclear propulsion, including the use of nuclear material to propel naval ships;
- Iran should not be permitted to exceed enrichment levels and stockpiles agreed to under the JCPOA;
- The JCPOA partners should reiterate that the IAEA is entitled to full access to all scientific and research entities as specified in the Comprehensive Safeguards Agreement and Additional Protocol, and that complementary access must be provided in either two hours or 24 hours (depending on the circumstances) as stipulated by the Additional Protocol;
- The IAEA Board should not accept any technical cooperation projects that are not within the limits of uranium enrichment and stocks permitted by the JCPOA, or that contribute to military nuclear applications;

• The P5+1 should reiterate that no technology provided to Iran related to nuclear reactors or fuel fabrication can be used in any facility besides a light water reactor that use uranium enriched to below 3.67 percent, and any deviation from those parameters requires prior consent of the technology holder or material provider;

• Iran should not conduct any design work for light water reactors and related facilities exceeding enrichment of 3.67 percent over the next fifteen years.

Over the past year, Iran has twice exceeded JCPOA limits on its heavy water stocks16 and has been granted exemptions to limits on stocks of enriched uranium and hot cells.17 Tehran’s recent announcement on nuclear propulsions systems now raises concerns that it may also violate additional provisions. By initiating the dispute resolution process, Iran has inadvertently opened an avenue for addressing the flaws in the nuclear deal. The United States and its negotiating partners should seize this opportunity to strengthen and clarify the JCPOA’s provisions to ensure that Iran cannot continue to exploit them.